



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/552,445

10/06/2005

Akira Sakawaki

Q75081

2287

23373 7590 02/13/2008
SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER

BERNATZ, KEVIN M

ART UNIT

PAPER NUMBER

1794

MAIL DATE

DELIVERY MODE

02/13/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/552,445	Applicant(s) SAKAWAKI ET AL.	
	Examiner Kevin M. Bernatz	Art Unit 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 November 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-10,12,13,18,21,22,25 and 26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-10,12,13,18,21,22,25 and 26 is/are rejected.
- 7) ☒ Claim(s) 3 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>1/17/08</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Amendments to claims 1 and 18, filed on November 17, 2007, have been entered in the above-identified application.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Examiner's Comments

3. Regarding the limitation(s) "epitaxially grown" in the claims, the Examiner has given the term(s) the broadest reasonable interpretation(s) consistent with the written description in Applicants' specification as it would be interpreted by one of ordinary skill in the art. *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997); *In re Donaldson Co., Inc.*, 16 F.3d 1190, 1192-95, 29 USPQ2d 1845, 1848-50 (Fed. Cir. 1994). See MPEP 2111. Specifically, the Examiner notes that the term has been given the broad interpretation that the two layers must simply be crystalline layers. I.e. "said upper layer comprising magnetic crystal grains that are formed and epitaxially grown on the magnetic crystal grains of the lower layer on an upper surface of said lower layer" in claim 1 merely requires that the upper and lower magnetic layers be crystalline. See Applicants' specification (page 6), the Advisory action mailed November 2, 2007, and original claims 16 and 17.

Request for Continued Examination

4. A Request for Continued Examination (RCE) under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 17, 2007 has been entered. An action on the RCE follows.

Double Patenting

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Art Unit: 1794

6. Claims 1, 3 – 10, 12, 13, 18, 21, 22, 25 and 26 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 - 18 of U.S. Patent No. 7,132,176 B2 (Iwasaki et al.) for the reasons of record as set forth in Paragraph No. 6 of the Office Action mailed on June 19, 2007, which refers back to Paragraph No. 5 of the Office Action mailed on January 8, 2007.

Regarding the amended language "said lower magnetic layer being directly adjacent and in contact with the orientation controlling layer", the Examiner "toes that Iwasaki et al. disclose embodiments possessing a single underlayer between the lower magnetic layer and the substrate (*claim 9*), hence meeting the claimed limitations.

Claim Objections

7. Claim 3 objected to because of the following informalities: "Al" is mistyped as "At" on line 3 (i.e. it appears that Applicants' are claiming an oxide of "At" when the Examiner deems that Applicants intended to claim an oxide of "Al". Appropriate correction is required.

Claim Rejections - 35 USC § 103

8. Claims 1, 3 – 7, 12, 13, 18, 21, 22 and 26 are rejected under 35 U.S.C. 102(a) as being unpatentable over Mukai et al. (WO 2003009280 A1) in view of Kaitsu et al. (U.S. Patent No. 6,562,481 B1) and Ikeda et al. (U.S. Patent No. 6,468,670 B1). See U.S. Patent No. 7,132,177 B2 to Mukai, which is the English language equivalent of WO '280 A1.

Regarding claims 1 and 18, Mukai discloses a magnetic recording medium and a method for the production of a magnetic recording medium (*Title*) comprising a nonmagnetic substrate (*Figure 1, element 11*) and at least three layers formed on the nonmagnetic substrate and comprised of a nonmagnetic orientation controlling layer (*element 12 and relevant disclosure thereto*) for controlling orientation of a layer formed directly thereon (*intended use limitation, but see col. 2, lines 30 – 45*), a magnetic layer (*elements 13 and 14 and relevant disclosure thereto*), and a protective layer (*col. 5, lines 58 – 65*); said magnetic layer comprising two or more magnetic layers (*elements 13 and 14*), at least one of said magnetic layers being a lower layer having Co as a main component and containing Pt and an oxide (*element 13; col. 4, lines 32 - 67; col. 5, lines 39 - 57; and col. 6, line 25 bridging col. 7, line 52*) and at least another of said magnetic layers being an upper layer having Co as a main component and containing Cr and no oxide (*col. 6, line 25 bridging col. 7, line 52*), said lower magnetic layer being directly adjacent and in contact with the orientation-controlling layer (*Figure 1, elements 12 and 13*) and comprising magnetic crystal grains isolated by the oxide and dispersed in the lower layer (*deemed necessarily present in the disclosed Co-oxide magnetic*

Art Unit: 1794

layers, but see also col. 3, lines 1 - 8), and said upper layer comprising magnetic crystal grains that are formed and epitaxially grown on the magnetic crystal grains of the lower layer on an upper surface of said lower layer (col. 2, lines 14 – 53 and col. 6, line 25 bridging col. 7, line 52).

Mukai fails to explicitly disclose that the recording medium possesses perpendicular magnetic layers having an easily magnetizing axis oriented mainly perpendicular relative to the nonmagnetic substrate.

However, Ikeda et al. disclose a dual layered magnetic recording medium comprising a lower granular layer (*the Examiner notes that oxide-containing layers are known “granular magnetic layers”*) and an upper non-granular layer (*the Examiner notes that the layer materials disclosed in Ikeda et al. are known crystalline materials*), including a CoCr alloy, wherein both layers are perpendicular magnetic layers meeting Applicants' claimed limitations (*Abstract; Figure 1 and relevant disclosure thereto*). The Examiner notes that Ikeda et al. teach that such a perpendicular recording medium possesses excellent signal-to-noise ratio (SNR) and thermal stability (*col. 2, lines 7 - 41*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the Applicants' invention to modify the device of Mukai to use perpendicular magnetic layers meeting Applicants' claimed limitations as taught by Ikeda et al., since Ikeda et al. disclose a substantially identical medium structure as Mukai and teach that such a structure can provide a perpendicular recording medium possessing excellent SNR and thermal stability.

Mukai further fails to disclose that that lower magnetic layer possess crystal grains vertically penetrating said lower layer in columnar form.

However, Ikeda et al. appear to disclose such a feature in Figure 1 and Kaitsu et al. explicitly teach that forming columnar grains in Co-oxide magnetic layers is beneficial in terms of the medium SNR, thermal stability, and recording density (*Figure 3 and relevant disclosure thereto; and col. 2, line 42 bridging col. 3, line 67*). The Examiner notes that while Kaitsu et al. *prefers* a circumferential orientation to the easy axis of magnetization of the magnetic layer [i.e. a “longitudinal or in-plane magnetic layer”] (*col. 4, lines 12 – 25*), they do not exclude perpendicular magnetic layers. The Examiner further notes that the benefits of reduced noise and improved thermal stability $(K_u \cdot V)/(k_b \cdot T)$ would be recognized as being desired in both types of recording media structures.

It would therefore have been obvious to one of ordinary skill in the art at the time of the Applicants’ invention to modify the device of Mukai to utilize columnar grains meeting Applicants’ claimed limitations as taught by Ikeda et al. and Kaitsu et al., since such a structure is disclosed to possess improved SNR, thermal stability and high recording density.

Regarding claims 3 and 4, Mukai discloses oxides meeting Applicants’ claimed limitations (*col. 4, lines 47 – 48*).

Regarding claims 5 and 6, Mukai discloses oxide, chromium and platinum meeting Applicants’ claimed limitations (*col. 4, lines 64 – 67 and col. 5, lines 39 – 57*).

Regarding claim 7, while Mukai discloses that various alloys can be used for the magnetic layer containing oxide, Mukai fails to disclose the exact alloys + concentrations claimed by Applicants. However, the Examiner notes that Ikeda et al. teach adding elements meeting Applicants' claimed limitations to the granular magnetic layer to optimize the magnetic characteristics (*col. 4, line 64 bridging col. 5, line 5*).

Regarding claims 12, 13, 21 and 22, Mukai discloses forming multiple oxide and/or non-oxide containing magnetic layers (*col. 6, line 39 bridging col. 7, line 2 and claims*).

Regarding claim 26, Mukai disclose apparatus limitations meeting the claimed nominal apparatus elements (*Figures 6 and 7 and relevant disclosure thereto*).

9. Claims 8 – 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mukai in view of Ikeda et al. and Kaitsu et al. as applied above, and further in view of Hayashi et al. (U.S. Patent No. 5,991,126).

Mukai, Ikeda et al., and Kaitsu et al. are relied upon as described above.

Regarding claims 8 – 10, while Mukai disclose CoCr alloys, including CoCrPt, as suitable for the upper non-oxide containing magnetic layer, none of the above give specifics regarding the exact alloy to use for the upper perpendicular magnetic layer.

However, Hayashi et al. teach that the composition of a perpendicular magnetic film is a known results effective variable and that it is known in the art to form high output, high recording density perpendicular magnetic films from CoCrPt-M alloys

meeting Applicants' claimed composition and atomic percent limitations (*col. 1, line 11 bridging col. 2, line 5; and col. 4, lines 25 – 54*).

Therefore, the Examiner deems that it would have been obvious to one having ordinary skill in the art to determine an optimal non-oxide Co-based magnetic layer composition meeting Applicants' claimed limitations by optimizing the results effective variable through routine experimentation. *In re Boesch*, 205 USPQ 215 (CCPA 1980); *In re Geisler*, 116 F. 3d 1465, 43 USPQ2d 1362, 1365 (Fed. Cir. 1997); *In re Aller*, 220 F.2d, 454, 456, 105 USPQ 233, 235 (CCPA 1955).

10. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mukai in view of Ikeda et al. and Kaitsu et al. as applied above, and further in view of Usuki et al. (U.S. Patent App. No. 2003/0134151 A1).

Mukai, Ikeda et al., and Kaitsu et al. are relied upon as described above.

None of the above disclose using a film-forming gas to which an oxygen gas is added to form the perpendicular magnetic layer including oxygen.

However, Usuki et al. teach forming oxide layers for perpendicular recording media meeting the claimed mol% limitations (Paragraphs 0039- 0044) while being sputter deposited with oxygen (Paragraphs 0046 - 0048) in order to form a perpendicular recording medium possessing excellent properties while being able to be used on polymeric substrates (Paragraph 0023).

It would therefore have been obvious to one of ordinary skill in the art at the time of the Applicants' invention to modify the device of Mukai in view of Ikeda et al. and

Kaitsu et al. to form the oxide containing magnetic layer as taught by Usuki et al., since such a method allows the formation of a perpendicular recording medium possessing excellent properties while being able to be used on polymeric substrates

Response to Arguments

11. The Double Patenting rejection of claims 1, 3 – 10, 12, 13, 18, 21, 22, 25 and 26 in view of Iwasaki et al.

Applicant(s) arguments have been considered but are moot in view of the new ground(s) of rejection (*i.e. the indication of how the above reference reads on the amended subject matter*).

12. The prior rejection of claims 1, 3 – 10, 12, 13, 18, 21, 22, 25 and 26 under 35 U.S.C § 102 and/or 103 – Kikitsu et al.

The above noted rejection has been withdrawn because Applicants' amendment(s) have set forth new limitations (e.g. "said lower magnetic layer being directly adjacent and in contact with the orientation-controlling layer") no longer anticipated, nor rendered obvious, by the above noted rejection.

13. The rejection of claims 1, 3 – 10, 12, 13, 18, 21, 22, 25 and 26 under 35 U.S.C § 103(a) – Mukai in view of various references

Applicant(s) arguments have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to Applicants' disclosure. Uwazumi et al. (U.S. Patent App. No. 2003/0064249 A1) disclose a similar structure to applicants, in that it is a perpendicular magnetic recording medium comprising at least a dual layered magnetic layer structure (*Abstract and Figures*). However, the Examiner notes that while Uwazumi et al. require the lower magnetic layer to be a crystalline layer with an oxide, they require the upper layer to be amorphous, hence not reading on the limitation of the upper layer comprising magnetic crystal grains (*elements 3 and 4 and relevant disclosure thereto*).

15. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Kevin M. Bernatz whose telephone number is (571) 272-1505. The Examiner can normally be reached on M-F, 8:30 AM - 5:00 PM.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Rena Dye can be reached on (571) 272-3186. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 1794

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Kevin M Bernatz, PhD/
Primary Examiner, Art Unit 1794

February 1, 2008